

TELESCOPE SYSTEM INSTRUMENTATION PROGRAM (TSIP)

Announcement of Opportunity

*TSIP Proposals FY 2002
December 5, 2001*

Deadline for Letters of Intent: January 18, 2002

Deadline for Full Proposals: March 29, 2002

*TSIP is administered on behalf of the National Science Foundation by the System Project Office
of the National Optical Astronomy Observatory (NOAO).*

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INTRODUCTION

A. OVERVIEW OF THE TSIP PROGRAM

The highest priority “moderate initiative” recommended in the recent report of the Astronomy and Astrophysics Survey Committee (AASC) is the Telescope System Instrumentation Program (TSIP). This initiative was envisioned by the Panel on Optical and Infrared Astronomy from the Ground as a \$5 million per year program that would have several positive effects on the emerging paradigm of the “integrated observing system,” a perspective of the public and private facilities used for ground-based O/IR astronomy in which complementarity and cooperation provide motivation for strategic decisions. The O/IR panel report describes TSIP as having three goals:

1. “... guid[ing] the evolution of the telescope system so that it becomes more powerful and more diverse; it would do this by, for example, favoring instruments with unique capabilities and those that would be particularly effective in reaching ... scientific goals...”
2. “achieving greater public access to these facilities”
3. “encouraging and leveraging the contribution of institutions that contribute nonfederal funds to the U.S. astronomy enterprise”

TSIP will work to accomplish these goals by funding the development of instruments or other improvements for the private observatories, in exchange for which telescope time on those facilities will be made available to the community.

Funding for TSIP will be provided by the Division of Astronomical Sciences of the National Science Foundation (NSF). This funding will be administered through subawards issued by NOAO and approved by NSF, and NOAO will be responsible for project oversight to assure cost and schedule performance for these subawards. All funds designated by NSF for TSIP will be passed to successful proposers through the NOAO subawards. NOAO will also make available some personnel resources to support the TSIP program, in addition to the new funds supplied by NSF.

This initial call for proposals to TSIP represents a significant step towards making the system envisioned in the AASC report a reality. In devising rules and guidelines for TSIP, an attempt has been made to balance the intent of the goals listed above with the realities of a program that will be perceived as effective and desirable by proposers, the community, and the NSF.

B. TWO TYPES OF TSIP PROPOSALS

There are two types of TSIP proposals: instrumentation proposals and improvement proposals.

1. **TSIP Instrumentation Proposals** are proposals for the design and construction of new, facility-class instruments for existing or pending large telescopes.

- ❖ Optical or infrared instrumentation of any kind for any telescope larger than 6-m aperture now in operation or under construction. Such proposals should include plans for two clearly distinct phases: a definition and design phase (Phase AB), and a construction and commissioning phase (Phase CD). The design phase concludes with a Critical Design Review (CDR) that verifies the cost and schedule for the construction phase.
- ❖ Proposals may request funding for up to five years of effort, including both phases AB and CD. All funded projects will be evaluated at the time of Critical Design Review (CDR). If the CDR leads to significant changes in cost and schedule compared to the original proposal, the decision to renew the proposal for continuing effort through the construction phase will be made based on peer-reviewed re-evaluation.
- ❖ Proposals for this instrumentation construction should provide community observing time equivalent in value to 50% of the NSF-supplied cost of the proposed new instrumentation.

2. TSIP Improvement Proposals are proposals for improvements other than new instrumentation for existing large telescopes.

- ❖ Any improvement that enhances scientific utility or efficiency *other* than the construction of a new instrument may be proposed for any telescope larger than 6-meter aperture. This includes upgrades to existing instruments, improvements to telescope image quality or operational efficiency, improvements to data handling and distribution infrastructure, improvements in support or services for visiting users of the telescopes, and any other improvements that can increase the telescope capabilities.
- ❖ Proposals may request funding for up to five years of effort. Funding will be provided in annual increments, contingent on satisfactory progress as evaluated by an annual progress review conducted by NOAO and reported to NSF.
- ❖ Proposals for this infrastructure improvement should provide community observing time equivalent in value to 100% of the NSF-supplied cost of the improvements.

Both categories of proposals must contain a description of the amount, scheduling, and nature of observing time to be made available to the U.S. community as a consequence of the requested funding. This observing time will be allocated by NOAO through the same mechanisms of merit review of observing proposals used to allocate time on the NOAO telescopes. Instrumentation proposals will be considered based either upon current availability of observing time or upon anticipated availability of observing time at future dates. Improvement proposals will only be considered for telescopes already in operation as of the first incremental funding date so that observing time can be made available as soon as the proposed effort begins.

Instrumentation proposals must have clear staffing and budgeting profiles and schedules for development of the proposed instrument. A management plan with clear milestones must be well defined. In particular, proposals should be clearly divided into a concept and design phase

(Phase AB), and a development and construction phase (Phase CD). Staffing and budgeting profiles for the two phases should be distinct. Proposals should contain full costs for both phases, and sources of uncertainty or needs for contingency should be clearly explained. Proposals should also contain a science justification explaining how the proposed instrument fits into the overall context of scientific capability needed by the entire U.S. astronomical community. Proposals may reference scientific priorities and needs as stated in various community studies or workshops.

Improvement proposals must show clearly what improvements in capabilities will be a consequence of the requested funding. A management plan with clear milestones against which progress can be measured must be well defined. Requests for funding that are simply substitutes for existing operations funds for telescopes are not appropriate.

For both categories of proposals, the value of community observing time to be allocated as a consequence of the requested funding is to be described and justified in the proposal. Determination and justification of the value of observing time is the sole responsibility of the proposers. Further details are given below.

C. ELIGIBILITY INFORMATION

This program is open to U.S. institutions that have a mechanism for providing observing time on a telescope of aperture 6 meters or greater through the NOAO time allocation process. This includes U.S. institutions that operate such telescopes, as well as U.S. institutions that can provide assured access through negotiated arrangements for observing time on U.S. or non-U.S. optical/infrared telescopes.

D. AWARD INFORMATION

It is anticipated that \$4 million will be available for the first year of funding for the TSIP program, eventually increasing to \$5 million per year.

Awards will be fixed price contracts administered to institutions as subawards from NOAO divided into multiple stages. Instrument development contracts will have a minimum of two stages (AB and CD); these may be further subdivided upon negotiation. Payment will be made in advance for all of Phase AB. The funding profile for Phase CD will be negotiated at the time of Critical Design Review. Infrastructure improvement proposals will be funded annually in advance, subject to satisfactory progress reviews.

In addition to the NSF-provided funds, NOAO will make available a limited amount of effort from its Engineering and Technical Services group to assist in project activities and oversight. In the first year of TSIP, this available effort will be:

- 0.5 FTE Project Manager
- 0.5 FTE Optical Designer
- 0.5 FTE Mechanical Engineer
- 0.5 FTE Mechanical Designer
- 0.5 FTE Electrical Engineer (for detector/controller work)

Proposers who wish to use NOAO support for their project may request it in their proposal, up to a maximum of 1 FTE distributed among the above categories. Depending on total requests from successful proposals, the actual NOAO effort to be made available may be negotiated.

For further information about this NOAO resource, proposers should contact:

Larry Daggert
Engineering and Technical Services
NOAO
PO Box 26732
Tucson, AZ 85726-6732
(ldaggert@noao.edu)

E. COMMUNITY ACCESS TO TELESCOPES

Each proposal *must* include a commitment of observing time on the telescope for which the instrument or improvement has been proposed. For improvement proposals, the value of the time offered must be equal to 100% of the NSF-supplied funds. For new instrument proposals, the value must be equal to 50% of the NSF-supplied funds.

For both types of TSIP proposal, the value of community observing time is to be described by an explicit calculation in the proposal. Determination and justification of the value of observing time is the sole responsibility of the proposers. Following each annual selection and awards, a description of the successful proposals and the costing of the observing time will be published through the NOAO system web site.

Proposers must specify in their proposal any conditions they wish to impose on the community access they are offering. NOAO is willing to provide interface and support services for community access, and the details of such arrangements can be negotiated following the successful review of a TSIP proposal. Proposers may specify particular modes of access, including limits on observing run lengths or their intent to carry out surveys on behalf of community-based teams.

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. LETTERS OF INTENT

▶ **The deadline for Letters of Intent is January 18, 2002.**

Letters of Intent for both types of TSIP proposals are required. Letters of Intent may be submitted in electronic version, paper copy, or both. Acceptable formats for the electronic versions are plain ASCII text, MS Word, Adobe PDF, or Postscript formats. If submitted electronically, send by email to syspo@noao.edu.

If submitted by mail, Letters of Intent should be sent to:

System Project Office
c/o NOAO Director's Office
National Optical Astronomy Observatory
P.O. Box 26732
Tucson, AZ 85726

1. Required Content

Letters of Intent should include (a) designation of the proposal as either an instrument or improvement proposal, (b) names and institutions of the PI and Co-I's, (c) general description of the instrument or improvement, (d) anticipated period of performance, (e) anticipated total funding or other resources sought through proposal, (f) description of facilities to which community access will be given. The purpose of obtaining Letters of Intent is to assemble a peer review panel without conflicts of interest and with expertise appropriate to the anticipated proposals.

Questions that arise during the period preceding the due date for Letters of Intent may be sent to syspo@noao.edu. Collected questions and answers will be displayed on the system web site: <http://www.noao.edu/system/>

B. FULL PROPOSALS

▶ **The deadline for full proposals is March 29, 2002.**

Proposals *must* be submitted electronically to syspo@noao.edu. In addition to the required electronic version, hard copies of the proposal may also be submitted. Acceptable file formats for the electronic version are MS Word, Adobe PDF, or Postscript.

1. Required Sections and Page Limits

Each proposal must contain five sections: (1) Science, (2) Technical, (3) Management, (4) Budget, and (5) Community Access. The length of the proposal without the Budget section should not exceed 20 pages. There are no page limitations on the Budget section.

- a. The **Science** section must describe the scientific capability that the proposed instrument or improvement provides or enables. It may refer to scientific motivations for particular capabilities derived from community meetings or workshops (e.g., The First Workshop on the Ground-Based O/IR System; see http://www.noao.edu/gateway/oir_workshop/). If this section does not refer to community-based efforts to identify needed capabilities, it should make the scientific case that the capability to be developed is as desirable as those that have been prioritized through such efforts. Specific scientific goals for the instrument or improvement and/or generally described studies that could be undertaken with community time may be stated.
- b. The **Technical** section must describe the technical approach that will be used in order to provide the proposed capability. The intent of this section is to convince the evaluation committee that the technical approach is viable and that the proposing team has the resources and the expertise to carry it out. This section should include an overview of the instrument or improvement, including optics, mechanical design, electronics, and software. It should present a discussion of the technical issues or concerns, and strategies for addressing them. It should also describe the flow down from scientific goals to functional performance requirements, and should provide evidence that the proposed instrument will satisfy these requirements.
- c. The **Management** section must describe the management approach to be used on the proposed project, including:
 - (i) Overall project structure and organization, including an organization chart
 - (ii) Project risks and key challenges and strategies for addressing these
 - (iii) Procedures and process to be used to manage the project, including:
 - Procedures to assign tasks and to control project personnel
 - Metrics to monitor and assess progress
 - Procedures and tools to plan and organize the project work
 - Plant and equipment
 - Persons or subcontractors
 - Dependencies among aspects of development, design, or fabrication
 - Documentation that will be generated
 - Summary of any effort requested from NOAO personnel resources

- (iv) A Work Breakdown Structure showing timeline of major tasks, resource loading, task durations, and task costs built up to the overall project cost.
 - (v) Dates of planned meetings and reviews and other critical milestones.
 - (vi) Quality assessment and control
- d. The **Budget** section will give the total cost of the instrument or improvement, and an annual payment schedule or funding profile for the funds requested from TSIP. The payment schedule should be justified on the basis of the work breakdown structure and planned commitments for large capital items. The budget should explicitly identify payroll, benefits, non-payroll, and agency-agreed overhead costs as they would be determined in a proposal to NSF. Summary budgets should be given using formats and categories similar to those used for NSF Fast Lane proposals. For instrument proposals, summary budgets should be given separately for phase AB and phase CD.
- e. The **Community Access** section must detail the manner in which telescope time is to be made available, including the total number of nights and their distribution over time, constraints on their use, the facilities to be made available, and so forth.

This section must include an explicit calculation of the value of community observing time used to determine the nights available to the community if the proposal is funded. This value should be calculated using such items as amortized construction cost, together with annual costs for operations and instruments. To provide accountability for the community, the calculation and explanation of the value of nights provided for successful TSIP proposals will be published on the System web site: <http://www.noao.edu/system/>

In addition, the **Community Access** section should include a thorough description of instruments available to visitors, services for visitors, data quality, data analysis capabilities, and any other factors that affect the judgment of the value of observing time on a particular telescope. Proposals should state a clear schedule and any contingency planning for providing the allocated community observing time.

Questions that arise during the period following the due date for Letters of Intent may be sent to syspo@noao.edu. Submitted questions and answers will be distributed to all potential proposers from whom letters of intent were received.

PROPOSAL REVIEW

A. REVIEW CRITERIA

Review and ranking of all TSIP proposals will be carried out by a peer review panel assembled by NOAO and approved by NSF whose membership excludes NOAO staff. This panel will meet in May, 2002 to conduct their review. Comments will be returned to all proposers following the review panel meeting. The merit review for TSIP proposals will include the same criteria as for proposals submitted to NSF. These criteria are:

❖ **What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

❖ **What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Additional criteria for TSIP proposals will include the following:

- ❖ Overall cost-effectiveness of the proposed effort
- ❖ Overall value of the proposed amount of time to the U.S. astronomical community
- ❖ Degree to which proposed instruments or improvements reflect priorities of the U.S. community
- ❖ Overall quality of the management and technical plans for accomplishing the effort
- ❖ Broader impacts of the proposed effort on, for example, the improvement of infrastructure for education through involvement of students in the proposed efforts, or the improvement of research infrastructure through the training of instrumentalists

Based on the panel rankings and available funding, NOAO will request NSF approval of subawards to fund successful proposals.

AWARD ADMINISTRATION AND PROGRAM OVERSIGHT

A. NOAO SYSTEM PROJECT OFFICE OVERSIGHT

Following NSF approval of the subawards, the NOAO contracts office will negotiate contracts with the selected proposers. These contracts will include the following elements:

- ❖ Description of instrumental capability or improvement to be provided
- ❖ Timeline, including milestones and payments
- ❖ Telescope time to be provided, together with contingencies and limitations
- ❖ Management plan
- ❖ Reporting and review schedule

NOAO's role is an oversight responsibility. The following activities are planned to fulfill this oversight role:

1. **Approval of management plan.** The Technical Project Manager of the NOAO System Project Office will review and approve the management plan for the work. This is to ensure that sufficient project management is being provided by the proposing institution, that sufficient resources are identified to carry out the work, and that the budget and schedule are credible. A satisfactory management plan is required before a subaward can be recommended to NSF for approval.
2. **Regular periodic reports.** During the design and/or construction of instruments, the instrument PI or Project Manager will be required to submit monthly reports to keep the System Project Office informed of progress and problems. These reports will summarize work completed, equipment or parts purchased, issues identified, and progress relative to the accepted management plan. All reports and review results will be publicly available on the NOAO System web site.
3. **Quarterly reviews for instrument projects.** It is expected that instrument development projects will have formal management and will include regular reviews, typically every three months. These will be attended by the System Project Office Technical Project Manager and any associated technical personnel who might provide needed expertise. The review documentation and response to the review will be publicly available.
4. **Formal decision following CDR.** Following the Critical Design Review at the end of Phase AB, a formal decision on continuation of TSIP funding through Phase CD is required. If the project is maintaining the cost and schedule in the original proposal within contingency, continuation will be automatic, subject to availability of NSF funds for TSIP. If there are projected cost overruns or schedule slips, the NOAO System

Project Office will convene a panel to evaluate the project in context of other existing or proposed TSIP projects and determine if the project should be continued with a revised cost and schedule. A revised subaward would require NSF approval.

5. **Review of progress on improvement proposals.** It is expected that infrastructure improvement projects will also have regular reviews, typically every six months, similar in nature to the quarterly reviews for instrument projects. Review materials and reports will be publicly available. The generic criteria to be used in annual evaluation for continuation of funding are successful completion of the work according to the original plan, and the improvement in performance of the facility described in the technical proposal. If improvements are not being made as proposed, the NOAO System Project Office will convene a panel to evaluate the project in context of other existing or proposed TSIP projects and determine whether the project should be continued. A revised subaward would require NSF approval.